

AMENDMENT UNDER 37 C.F.R. § 1.116 – EXPEDITED PROCEDURE
Serial Number: 09/964,746
Filing Date: September 28, 2001
Title: METHOD AND STRUCTURE FOR IDENTIFYING LEAD-FREE SOLDER
Assignee: Intel Corporation

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REMARKS

Claims 9 and 32 have been amended, claims 27-30 have been canceled, and no claims have been added; as a result, claims 1-26 and 31-35 are now pending in the above identified patent application.

§102 Rejection of the Claims

Claims 1, 2, 6-10, 12, 14-17, 19, as understood, 21 as understood and 23 were rejected under 35 U.S.C. § 102(b) as being anticipated by Tadauchi *et al.* (U.S. 6,123,248). Applicant respectfully traverses the rejections of claims 1, 2, 6-10, 12, 14-17, 19, 21, and 23.

Claim 1 recites, "placing a predetermined solder pattern onto a pad." Claims 19 and 23 each recite "a heated solder pattern formed thereon." In contrast, Tadauchi *et al.* teaches at column 2, lines 65-67, "dispensing the molten binary solder by putting the base material into contact with the molten binary solder," and at column 3, lines 23-24, "the nozzle unit dispenses the molten binary solder in the form of droplets," and further at column 3, lines 27-29, "a soldering iron for melting a solder by heating the soldering iron in contact with the solder so that the molten solder is disposed on the base material." Applicant's representative has read Tadauchi *et al.* and it appears to applicant's representative that the phrase "solder pattern" is not included in Tadauchi *et al.* Hence, Tadauchi *et al.* does not teach "placing a predetermined solder pattern onto a pad," so Tadauchi *et al.* fails to teach each of the elements of claim 1. And Tadauchi *et al.* fails to teach, "a heated solder pattern formed thereon," so Tadauchi *et al.* fails to teach each of the elements of both claims 19 and 23.

In an attempt to overcome this failure, the final Office action on page 4, lines 1-6 states, "In response to Applicant's argument that Tadauchi *et al.* do not teach the limitation ... visual appearance of a heated predetermined pattern being indicative of whether solder is lead free ... (Cf. page 6 of Applicants' Amendment), Tadauchi *et al.* cannot be clearer that a Lead film gives a different type of film than other e.g. Zinc solder. A leaded solder is relatively thin compared to a non-leaded solder. Anyone skilled in the art can visually see the difference." This attempt to establish the missing elements fails for two reasons. First, elements under the § 102 anticipation standard are established by reference to teachings in the cited reference. The statement does not

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identify teachings of the cited reference, so the statement is irrelevant. Second, assuming *argumendo* that the statements are correct, the statements only disclose "film," which applicant submits is not a solder pattern. So, the statements still fail to disclose the elements, as recited above, of claims 1, 19, and 23. Thus, the Office action fails to state a *prima facie* case of anticipation with respect to claim 1, 19, and 23. Therefore, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 1, 19, and 23.

Claims 2, and 6-8 are dependent on claim 1. Claim 21 is dependent on claim 19. For reasons analogous to those provided above and elements in the claims, applicant respectfully submits that the Office action fails to state a *prima facie* case of anticipation with respect to claims 2, 6-8, and 21. Therefore, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 2, 6-8, and 21.

Claim 9, as amended recites, "a visual appearance of said heated solder being indicative of whether said solder is lead-free based on the amount of reflow of said solder on said pad." (emphasis added) In contrast, Tadauchi *et al.* at column 5, lines 21-24 teaches, "On observing the soldering, there can be seen a phenomenon that a very thin film is formed on the surface of the molten solder and its tends to hinder the base material from contacting with the molten solder." Thus, Tadauchi *et al.* teaches observation of films on molten solder, and fails to disclose "a visual appearance of said heated solder being indicative of whether said solder is lead-free based on the amount of reflow of said solder on said pad" as recited in claim 9. Thus, the Office action fails to state a *prima facie* case of anticipation with respect to claim 9. Therefore, applicant requests withdrawal of the rejection and reconsideration and allowance of claim 9.

Claims 10, 12, and 14-17 are dependent on claim 9. For reasons analogous to those provided above and elements in the claims, applicant respectfully submits that the Office action fails to state a *prima facie* case of anticipation with respects to claims 10, 12, and 14-17. Therefore, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 10, 12, and 14-17.

In addition, the Office action on page 4, lines 9-12 states, "If Applicants persist in their argument that Tadauchi *et al* do not anticipate or make obvious the claimed invention, Applicants are requested to provide inter alia what they believe is the appropriate age,

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experience, and training of the fictitious person of ordinary skill in this art." (emphasis added) Applicant objects to this statement. As stated above, the standard for anticipation is "Anticipation requires the disclosure in a prior art reference of each and every element as set forth in the claim." Therefore, if the cited prior art, in this case Tadauchi *et al.*, fails to teach or disclose each and every element as set forth in the claims, there is no anticipation. With regards to anticipation, it is irrelevant what age, experience and training one of ordinary skill in the art possesses. With regards to obviousness, the Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To do that the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.* Applicant therefore respectfully submits that if applicant "persists in their argument that Tadauchi *et al.* do [sic] not anticipate or make obvious the claimed invention," applicant is under no obligation to provide any information regarding applicant's beliefs regarding persons of ordinary skill in the art.

§103 Rejection of the Claims

Claims 3-5, 11, 13, 18, 20, 22, as understood, 24-26 and 31-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tadauchi *et al.* Applicant traverses the rejections of claims 3-5, 11, 13, 18, 20, 22, 24-26, and 31-35.

Claims 3 recites, "passing solder through at least one stencil aperture and onto said pad." Claim 11 recites, "passing said solder through at least one stencil aperture and onto said pad." The Office action on page 3 states, "It would have been obvious to place solder through at least one stencil aperture and onto a pad of a PCB since this is old and hence obvious in the art." Applicant respectfully submits that the Examiner is taking official notice of the elements in claims 3 and 11. Applicant respectfully objects to the taking of official notice in a single reference obviousness rejection; and pursuant to M.P.E.P. § 2144.03, applicant traverses the assertion of official notice and requests that the Examiner cite a reference that teaches the missing elements. If the Examiner cannot cite a reference that teaches the missing elements, applicant respectfully requests that the Examiner provide an affidavit describing how the missing elements are present in the prior art. If the Examiner cannot cite a reference or provide an

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affidavit, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 3 and 11.

Claims 4, 13, and 34 recite, "said predetermined solder pattern comprises at least one symbol." Claim 20 recites, "said predetermined solder pattern comprises at least one of a symbol." The Office action on page 3 states that the limitations recited in claims 4 and 13 "are held to be mere design choice inasmuch as these limitations solve no specific problem nor are for any specific purpose." Applicant respectfully disagrees with this statement and submits that the Examiner is taking official notice of the elements in claims 4, 13, 20, and 34. Applicant respectfully objects to the taking of official notice in a single reference obviousness rejection; and pursuant to M.P.E.P. § 2144.03, applicant traverses the assertion of official notice and requests that the Examiner cite a reference that teaches the missing elements. If the Examiner cannot cite a reference that teaches the missing elements, applicant respectfully requests that the Examiner provide an affidavit describing how the missing elements are present in the prior art. If the Examiner cannot cite a reference or provide an affidavit, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 4, 13, 20 and 34.

Claims 5 and 18 recite, "placing solder at one end of an indicator strip." The Office action on page 3 states that the limitations recited in claims 5 and 18 "are held to be mere design choice inasmuch as these limitations solve no specific problem nor are for any specific purpose." Applicant respectfully disagrees with this statement and submits that the Examiner is taking official notice of the elements in claims 5 and 18. Applicant respectfully objects to the taking of official notice in a single reference obviousness rejection; and pursuant to M.P.E.P. § 2144.03, applicant traverses the assertion of official notice and requests that the Examiner cite a reference that teaches the missing elements. If the Examiner cannot cite a reference that teaches the missing elements, applicant respectfully requests that the Examiner provide an affidavit describing how the missing elements are present in the prior art. If the Examiner cannot cite a reference or provide an affidavit, applicant requests withdrawal of the rejections and reconsideration and allowance of claims 5 and 18.

Claims 22, 31 and 33 recite, "predetermined solder pattern." For reasons analogous to those stated above with regards to claim 1, applicant respectfully submits that Tadauchi *et al.* fails to recite, "predetermined solder pattern," and so Tadauchi *et al.* fails to teach each of the

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elements of claims 22, 31, and 33. Thus, the Office action fails to state a *prima facie* case of obviousness with respect to claims 22, 31, and 33.

Claims 34 and 35 are dependent on claim 33. For reasons analogous to those provided above and elements in the claims, applicant respectfully submits that the Office action fails to state a *prima facie* case of obviousness with respects to claims 34 and 35.

Claim 24 recites, "at least one indicator provided on said printed circuit board." Applicant's representative has read Tadauchi *et al.* and it appears to applicant's representative that "at least one indicator provided on said printed circuit board," is not included in Tadauchi *et al.* Thus, Tadauchi *et al.* fails to teach each of the elements of claim 24. Thus, the Office action fails to state a *prima facie* case of obviousness with respect to claim 24.

Claims 25 and 26 are dependent on claim 24. For reasons analogous to those provided above and elements in the claims, applicant respectfully submits that the Office action fails to state a *prima facie* case of obviousness with respects to claims 25 and 26.

In addition, applicant respectfully submits that Tadauchi *et al.* teaches away from the present invention. A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path the applicant took. *In re Gurley*, 27 F.3d 551, 31 USPQ 2d 1130, 1131 (Fed. Cir. 1994); *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966); *In re Spinnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969); *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (C.C.P.A. 1963). The claims of the present invention recite identifying or determining whether solder is lead free. Claim 1 recites, "a visual appearance of said heated predetermined solder pattern being indicative of whether said solder is lead-free." Claim 9 recites, "a visual appearance of said heated solder being indicative of whether said solder is lead-free." Claim 19 recites, "identifying whether solder on said printed circuit board is lead-free based on whether said heated solder pattern is substantially similar to a predetermined solder pattern." Claim 23 recites, "identifying whether solder on said printed circuit board is lead-free based on a distance that said solder reflows." Claim 33 recites, "determining that said solder is lead-free if said predetermined solder pattern after heating is in substantially a same pattern as said predetermined solder pattern before heating." Claims 3-5 and 31 are dependant on claim 1, claims 11, 13, 18 and 32 are dependent

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on claim 9, claims 20 and 22 are dependent on claim 19, claims 24-26 are dependent on claim 23, and claims 34-35 are dependent on claim 33, and therefore include all the elements of their respective independent claims.

In contrast, Tadauchi *et al.* at column 5, lines 12-15 states, "since the lead is a component which imparts wettability to the solder, solders containing no lead, such as a tin-zinc solder, a silver-tin solder and the like are normally deficient in wettability and their adhesion to the base material deteriorates." Further, at column 5, lines 19-21, "low wettability is another reason for preventing realization of a solder containing no lead." However, at column 5, line 63 through column 6, line 1, Tadauchi *et al.* states, "As is clear from the above description, if the base material contacts the molten solder in a non-oxidizing environment while oscillatory wave energy is supplied to the base material, wettability of the solder is remarkably improved and soldering with a binary solder containing no lead can be achieved." And at column 8, lines 45-48, "the oscillatory wave energy acts to improve not only the wettability but also separation of the solder. As a result, according to the present invention, the solder is provided with a very high wettability and excellent separation." Thus, Tadauchi *et al.* discloses using a non-oxidizing environment and oscillatory wave energy to improve wettability and separation of solder, especially lead free solder, in order to make *lead free solder appear and behave like lead based solder*. Therefore, Tadauchi *et al.* teaches away from the idea of being able to inspect the appearance of the solder to determine whether the solder is lead based or lead free because Tadauchi *et al.* discloses lead free solder that has wettability and separation characteristics similar to those of lead based solder. Therefore, Tadauchi *et al.* teaches away from a solder indicative of whether said solder is lead free as recited in the claims of the present invention.

For these reasons and the reasons stated above, applicant respectfully requests withdrawal of the rejections and reconsideration and allowance of claims 3-5, 11, 13, 18, 20, 22, 24-26 and 31-35.

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Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone applicant's attorney at 612-371-2109 to facilitate prosecution of the above-identified patent application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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November 1, 2004

By

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I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on the date shown below.

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